

CLAIMS

1. An information processing method for maintaining, in a system in which each of a plurality of processes connected via an information transmission medium holds and uses shared data to be shared by the processes, consistency of shared data held by the respective processes, comprising:

an output step of outputting, when a manipulation request for the shared data is generated, request information that represents the manipulation request onto the information transmission medium;

a reception step of receiving the request information output in the output step and response information corresponding to request information output by other processes from the information transmission medium; and

a manipulation execution step of executing a manipulation for the shared data in accordance with manipulation request indicated by the response information received in the reception step.

2. The method according to claim 1, wherein the manipulation execution step includes a step of executing the manipulation request generated in the self process only after the corresponding response information is received in the reception step.

3. The method according to claim 1, wherein the manipulation execution step includes a step of

executing, when a predetermined period of time elapses after generation of the manipulation request before reception of the corresponding response information in the reception step, the manipulation request generated 5 in the self process without waiting for reception of that response information.

4. The method according to claim 3, further comprising a queue control step of registering a queue item in a manipulation queue in response to generation 10 of the manipulation request, and setting a corresponding queue item to be an already processed item when the manipulation request is executed, and

wherein the manipulation execution step includes a step of executing, when an item in the manipulation 15 queue corresponding to the manipulation request indicated by the response information is not set to be an already processed item, the manipulation request indicated by the response information.

5. The method according to claim 1, wherein the 20 manipulation execution step operates in one of a plurality of update modes which include:

a first mode of executing a manipulation request generated in the self process only after corresponding response information is received in the reception step; 25 and

a second mode of executing a manipulation request generated in the self process at an earlier one of an

elapse timing of a predetermined period of time after generation of the manipulation request, and a reception timing of corresponding response information in the reception step.

5 6. The method according to claim 5, wherein the shared data consists of a plurality of items, each of which contains designation information used to designate a update mode to be adopted.

10 7. The method according to claim 6, further comprising a switching step of switching the update mode for each of the plurality of items.

15 8. The method according to claim 7, wherein the switching step includes a step of providing a user interface that allows a user to select an object display corresponding to a desired item and to designate a desired update mode.

20 9. The method according to claim 7, wherein a update mode switching result in the switching step is reflected on the shared data of the plurality of clients.

10. The method according to claim 7, wherein a update mode switching result in the switching step is reflected on the shared data of a client of interest.

25 11. The method according to claim 5, further comprising a setting step of setting the predetermined period of time.

12. The method according to claim 1, wherein
execution of the manipulation request in the
manipulation execution step executes an update process
for updating the shared data and a drawing process for
5 updating drawing on the basis of the updated shared
data in turn, and

the manipulation execution step includes a step
of executing, when the update process is ready to be
executed before reception of corresponding response
10 information, the manipulation request generated in the
self process without waiting for reception of that
response information.

13. The method according to claim 7, wherein the
switching step includes a step of setting the update
15 mode in accordance with manipulation contents for an
object corresponding to an item.

14. An information processing method for
maintaining, in a system in which each of a plurality
of processes connected via an information transmission
20 medium holds and uses shared data to be shared by the
processes, consistency of shared data held by the
respective processes, comprising:

an establishment step of establishing connection
to a plurality of client processes;

25 a reception step of receiving an event associated
with a change in shared data from each of the plurality
of client processes; and

an issuance step of issuing the event received in the reception step to the plurality of client processes.

15. The method according to claim 14, wherein the event received in the reception step contains update mode information indicating a change sequence of the shared data, and

the issuance step includes a step of controlling distribution destinations of the event on the basis of the update mode information.

10 16. The method according to claim 15, wherein the issuance step includes a step of checking based on the update mode information in the event received in the reception step if an issuance source of the event has already processed the shared data, and not issuing that 15 event to the client as the issuance source when it is determined that the issuance source has already processed the shared data.

17. The method according to claim 16, wherein the event further contains a time-out time, and

20 it is determined that the issuance source of the event has already processed the shared data when the update mode information indicates a update mode that executes a manipulation when the time-out time elapses, and when a current time has passed the time-out time.

25 18. An information processing apparatus for maintaining, in a system in which each of a plurality of processes connected via an information transmission

medium holds and uses shared data to be shared by the processes, consistency of shared data held by the respective processes, comprising:

an output unit configured to, when a manipulation 5 request for the shared data is generated, output request information that represents the manipulation request onto the information transmission medium;

a reception unit configured to receive the request information output by said output unit and 10 response information corresponding to request information output by other processes from the information transmission medium; and

a manipulation execution unit configured to execute a manipulation for the shared data in 15 accordance with manipulation request indicated by the response information received in said reception unit.

19. The apparatus according to claim 18, wherein said manipulation execution unit executes the manipulation request generated in the self process only 20 after the corresponding response information is received by said reception unit.

20. The apparatus according to claim 18, wherein when a predetermined period of time elapses after generation of the manipulation request before reception 25 of the corresponding response information by said reception unit, said manipulation execution unit executes the manipulation request generated in the self

process without waiting for reception of that response information.

21. The apparatus according to claim 20, further comprising a queue control unit configured to register 5 a queue item in a manipulation queue in response to generation of the manipulation request, and setting a corresponding queue item to be an already processed item when the manipulation request is executed, and wherein when an item in the manipulation queue 10 corresponding to the manipulation request indicated by the response information is not set to be an already processed item, said manipulation execution unit executes the manipulation request indicated by the response information.

15 22. The apparatus according to claim 18, wherein said manipulation execution unit operates in one of a plurality of update modes which include:

a first mode of executing a manipulation request generated in the self process only after corresponding 20 response information is received by said reception unit; and

a second mode of executing a manipulation request generated in the self process at an earlier one of an elapse timing of a predetermined period of time after 25 generation of the manipulation request, and a reception timing of corresponding response information by said reception unit.

23. The apparatus according to claim 22, wherein the shared data consists of a plurality of items, each of which contains designation information used to designate a update mode to be adopted.

5 24. The apparatus according to claim 23, further comprising a switching unit configured to switch the update mode for each of the plurality of items.

10 25. The apparatus according to claim 24, wherein said switching unit provides a user interface that allows a user to select an object display corresponding to a desired item and to designate a desired update mode.

15 26. The apparatus according to claim 24, wherein a update mode switching result of said switching unit is reflected on the shared data of the plurality of clients.

27. The apparatus according to claim 24, wherein a update mode switching result of said switching unit is reflected on the shared data of a client of interest.

20 28. The apparatus according to claim 22, further comprising a setting unit configured to set the predetermined period of time.

25 29. The apparatus according to claim 18, wherein execution of the manipulation request by said manipulation execution unit executes an update process for updating the shared data and a drawing process for

updating drawing on the basis of the updated shared data in turn, and

when the update process is ready to be executed before reception of corresponding response information,
5 said manipulation execution unit executes the manipulation request generated in the self process without waiting for reception of that response information.

30. The apparatus according to claim 24, wherein
10 said switching unit sets the update mode in accordance with manipulation contents for an object corresponding to an item.

31. An information processing apparatus for maintaining, in a system in which each of a plurality
15 of processes connected via an information transmission medium holds and uses shared data to be shared by the processes, consistency of shared data held by the respective processes, comprising:

an establishment unit configured to establish
20 connection to a plurality of client processes;

a reception unit configured to receive an event associated with a change in shared data from each of the plurality of client processes; and

25 an issuance unit configured to issue the event received by said reception unit to the plurality of client processes.

32. The apparatus according to claim 31, wherein the event received by said reception unit contains update mode information indicating a change sequence of the shared data, and

5 said issuance unit controls distribution destinations of the event on the basis of the update mode information.

33. The apparatus according to claim 32, wherein said issuance unit checks based on the update mode 10 information in the event received by said reception unit if an issuance source of the event has already processed the shared data, and does not issue that event to the client as the issuance source when it is determined that the issuance source has already 15 processed the shared data.

34. The apparatus according to claim 33, wherein the event further contains a time-out time, and

it is determined that the issuance source of the event has already processed the shared data when the 20 update mode information indicates a update mode that executes a manipulation when the time-out time elapses, and when a current time has passed the time-out time.

35. A control program for making a computer execute an information processing method of any one of 25 claims 1 to 17.

36. A storage medium storing a control program for making a computer execute an information processing method of any one of claims 1 to 17.